PROCEEDINGS OF

THE INSTITUTION OF CIVIL ENGINEERS

PART III

ENGINEERING DIVISIONS

PUBLIC HEALTH · STRUCTURAL & BUILDING · WORKS CONSTRUCTION

VOLUME 1 1952

LONDON:
Published by The Institution,
GREAT GEORGE STREET, S.W.1

The rights of Publication and of Translation are reserved.

PROCEEDINGS OF

THE INSTITUTION OF CIVIL ENGINEERS

Part III, Vol. 1, 1952.

April, August, and December, 1952.

CONTENTS

	PAGE
"Relation between Daily Rainfall and Flow of the River Shin." R. H. MacDonald (with oral discussion)	1
"The Rapid Calculation of the Plastic Collapse Load for a Framed Structure." Dr B. G. Neal and Dr P. S. Symonds (with oral discussion)	58
"The Construction of Kasr el Zayat Railway Bridge." K. E. Hyatt and G. W. Morley (with oral discussion)	101
"Some Problems in the Disposal of Industrial Effluents and Domestic Wastes." J. T. Calvert and P. M. Amcotts (with oral discussion)	141
"The Construction of Loch Sloy Dam." James Stevenson (with oral discussion)	169
"Some Recent Experience in Composite Pre-cast and In-Situ Concrete Construction, with Particular Reference to Pre-stressing." F. J. Samuely (with oral discussion)	222
"The Impact of Radio-activity on Public Health Engineering Services." Dr Arthur Key and A. W. Kenny	290
Correspondence on Public Health Paper No. 4 (Calvert and Amcotts)	295
Personnel of the Engineering Divisional Boards for Session 1952–53	296
"Buoyant Foundations in Soft Clay for Oil-Refinery Structures at Grangemouth." C. W. Pike and B. F. Saurin (with oral discussion)	301
"The Construction of the Caisson forming the Foundation to the Circulating-Water Pump-House for the Uskmouth Generating Station." W. Storey Wilson and F. W. Sully (with oral discussion)	335
"The Historical Development of Structural Theory." Dr S. B. Hamilton (with oral discussion)	374
"Experimental Analysis of Space Structures, with Particular Reference to Braced Domes; with a Note on Stresses in Supporting Ring-Girders." Z. S. Makowski and Professor A. J. S. Pippard	420
Correspondence on Works Paper No. 20 (Stevenson)	442
Correspondence on Structural Paper No. 30 (Samuely)	446

PRINTED IN GREAT BRITAIN BY WILLIAM CLOWES AND SONS, LIMITED
LONDON AND BECCLES

NAME AND SUBJECT INDEXES

FOR

Proceedings, Part III, Vol. 1, 1952.

April, August, and December, 1952.

620.6
In 8p

NAME INDEX

FOR

Proceedings, Part III, Vol. 1, 1952.

April, August, and December, 1952.

AUTHOR INDEX

Amcotts, P. M. *See* Calvert and Amcotts.

Calvert, J. T., and P. M. Amcotts. **Some Problems in the Disposal of Industrial Effluents and Domestic Wastes.** 141 (Apr.); *Discussion*, 154 (Apr.); *Correspondence*, 295 (Aug.).

Hamilton, Dr S. B. **The Historical Development of Structural Theory.** 374 (Dec.); *Discussion*, 402 (Dec.).
Hyatt, K. E., and G. W. Morley. **The Construction of Kafr el Zayat Bridge.** 101 (Apr.); *Discussion*, 129 (Apr.).

Kenny, A. W. *See* Key and Kenny.
Key, Dr Arthur, and A. W. Kenny. **The Impact of Radio-activity on Public Health Engineering** (Lecture). 280 (Aug.).

MacDonald, R. H. **Relation between Daily Rainfall and Flow of the River Shin.** 1 (Apr.); *Discussion*, 39 (Apr.).
Makowski, Z. S., and Prof. A. J. S. Pippard. **Experimental Analysis of Space Structures, with Particular Reference to Braced Domes; with a Note on Stresses in Supporting Ring-Girders.** 420 (Dec.).
Morley, G. W. *See* Hyatt and Morley.

Neal, Dr B. G., and Dr P. S. Symonds. **The Rapid Calculation of the Plastic Collapse Load for a Framed Structure.** 58 (Apr.); *Discussion*, 72 (Apr.).

Pike, C. W., and B. F. Saurin. **Buoyant Foundations in Soft Clay for Oil-Refinery Structures at Grangemouth.** 301 (Dec.); *Discussion*, 321 (Dec.).
Pippard, Prof. A. J. S. *See* Makowski and Pippard.

Samuely, F. J. **Some Recent Experience in Composite Pre-cast and In-Situ Concrete Construction, with Particular Reference to Pre-stressing.** 222 (Aug.); *Discussion*, 259 (Aug.); *Correspondence*, 446 (Dec.).
Saurin, B. F. *See* Pike and Saurin.
Stevenson, James. **The Construction of Loch Sloy Dam.** 169 (Aug.); *Discussion*, 205 (Aug.); *Correspondence*, 442 (Dec.).
Sully, F. W. *See* Wilson and Sully.
Symonds, Dr P. S. *See* Neal and Symonds.

Wilson, W. Storey, and F. W. Sully. **The Construction of the Caisson forming the Foundation to the Circulating-Water Pump-House for the Uskmouth Generating Station.** 335 (Dec.); *Discussion*, 357 (Dec.).

INDEX TO CONTRIBUTORS TO DISCUSSIONS

Abeles, Dr P. W., 261 (Aug.).
Ager, J. W. A., 448 (Dec.).
Amcotts, P. M. *See* Calvert and Amcotts.

Baker, Prof. A. L. L., 84 (Apr.); 274 (Aug.).
Baker, Prof. J. F., 78 (Apr.).
Barnes, E. M., 332 (Dec.).
Benjamin, A. L., 270 (Aug.).
Binns, R. D., 269 (Aug.).
Bjuggren, Ulf, 447 (Dec.).
Bondi, O., 409 (Dec.).
Boulton, M. S., 88 (Apr.).
Braine, C. D. C., 366 (Dec.).
Burden, K. C., 135 (Apr.).

Calvert, J. T., and P. M. Amcotts, 166 (Apr.); 297 (Aug.).
Campbell, Peter, 213 (Aug.).
Capper, P. L., 413 (Dec.).
Cochrane, N. J., 43 (Apr.).
Cronin, H. F., 154 (Apr.).
Cuerel, John, 259 (Aug.); 329 (Dec.).

Davey, Dr Norman, 409 (Dec.).

Eggleton, N. G., 215 (Aug.).

Fane, R. W. A., 368 (Dec.).
Fawcett, J. W. S., 164 (Apr.).
Fisher, J. M., 214 (Aug.).
Foulkes, J. D., 88 (Apr.).
Foulkes, R. A., 79 (Apr.).

Gardner, G. A., 405 (Dec.).
Gaudin, R. F. B., 296 (Aug.).
Glasspoole, Dr J., 41 (Apr.).
Gold, E., 48 (Apr.).
Golder, Dr H. Q., 322, 411 (Dec.).
Goldstein, Adolf, 273 (Aug.).
Gwynn, J. D., 208 (Aug.).

Haigh, I. P., 165 (Apr.).
Hajnal-Kónyi, Dr K., 265 (Aug.).
Hamilton, Dr S. B., 416 (Dec.).
Harding, H. J. B., 357 (Dec.).
Hartley, A. C., 321 (Dec.).
Hawkins, L. E., 134 (Apr.).
Haythornthwaite, R. M., 90 (Apr.).
Heyman, Jacques, 80 (Apr.).
Hiley, B. A. E., 361 (Dec.).
Hoffman, G. R., 51 (Apr.).
Hogg, C., 161 (Apr.).
Hopkins, T. H., 133 (Apr.).
Horne, Dr M. R., 89 (Apr.).
Howells, D. A., 91 (Apr.).
Humphries, E. F., 274 (Aug.).
Hyatt, K. E., and G. W. Morley, 135 (Apr.).

Jones, S. E., 364 (Dec.).

Kennard, Julius, 49 (Apr.).
Kerenski, O. A., 131 (Apr.).
Kibblewhite, G. V., 92 (Apr.).

Lacey, Gerald, 39 (Apr.).
Lambert, Alan P., 209 (Aug.).
Little, D. H., 93 (Apr.); 331 (Dec.).

McClean, W. M., 40 (Apr.).
MacDonald, R. H., 54 (Apr.).
MacTaggart, Sir Andrew, 205 (Aug.).
Manning, G. P., 262 (Aug.).
Manning, H. D., 160 (Apr.).
Mears, R. P., 410 (Dec.).
Micklethwaite, F., 95 (Apr.).
Morley, G. W. *See* Hyatt and Morley.
Murdock, Dr L. J., 325 (Dec.).

Neal, Dr B. G., and Dr P. S. Symonds, 72, 95 (Apr.).

Oehler, Prof. L. T., 270 (Aug.).

Pannell, J. P. M., 134 (Apr.).
Parker, Dr A., 156 (Apr.).
Penman, Dr H. L., 45 (Apr.).
Pike, C. W., 334 (Dec.).
Pippard, Prof. A. J. S., 92 (Apr.); 414 (Oct.).

Rennie, W. J. H., 213 (Aug.).
Revesz, Stephen, 275 (Aug.).
Ridley, Thomas, 446 (Dec.).
Roberts, F. W., 158 (Apr.).

Samuely, F. J., 276 (Aug.); 449 (Dec.).
Saurin, B. F., 332 (Dec.).
Shilston, A. W., 295 (Aug.).
Short, W. D., 363 (Dec.).
Skempton, Dr A. W., 323 (Aug.); 402 (Dec.).
Smith, H. Shirley, 129 (Apr.); 359 (Dec.).
Sparkes, F. N., 442 (Dec.).
Stevenson, James, 216 (Aug.); 444 (Dec.).
Sully, F. W., 371 (Dec.).
Symonds, Dr P. S. *See* Neal and Symonds.

Townend, C. B., 159 (Apr.).

Vokes, F. C., 155 (Apr.).

Waddington, J. C., 212 (Aug.).
Walley, F., 267 (Aug.).
Walsh, Prof. H. N., 166 (Apr.).
Walters, R. C. S., 53 (Apr.).
Webb, W. H., 130 (Apr.).
Wedgwood, P., 162 (Apr.).
Wilkins, R. J., 415 (Dec.).
Williams, N. S., 362 (Dec.).
Wilson, W. Storey, 369 (Dec.).
Wolf, P. O., 44 (Apr.); 443 (Dec.).
Worth, R. E. J., 215 (Aug.).

Young, J. McHardy, 328 (Dec.).
Young, William, 206 (Aug.).

SUBJECT INDEX

FOR

Proceedings, Part III, Vol. 1, 1952.

April, August, and December, 1952.

Bridges:
Egypt.—**The Construction of Kafr el Zayat Bridge,** K. E. Hyatt and G. W. Morley. 101 (Apr.); *Discussion*, 129 (Apr.).

Concrete:
Pre-cast.—**Some Recent Experience in Composite Pre-cast and In-Situ Concrete Construction, with Particular Reference to Pre-stressing,** F. J. Samuely, 222 (Aug.); *Discussion*, 259 (Aug.); *Correspondence*, 446 (Dec.).
Pre-stressed.—*See* Concrete, pre-cast.

Dams and Reservoirs:
Construction.—**The Construction of Loch Sloy Dam,** James Stevenson. 169 (Aug.); *Discussion*, 205 (Aug.); *Correspondence*, 442 (Dec.).
Divisional Boards for Session 1952–53, Personnel of. 298 (Aug.).

Foundations:
Buoyant.—**Buoyant Foundations in Soft Clay for Oil-Refinery Structures at Grangemouth,** C. W. Pike and B. F. Saurin. 301 (Dec.); *Discussion*, 321 (Dec.).
Power-Station.—**The Construction of the Caisson forming the Foundation to the Circulating-Water Pump-House for the Uskmouth Generating Station,** W. Storey Wilson and F. W. Sully. 335 (Dec.); *Discussion*, 357 (Dec.).

History.—*See* Structures, History.
Hydrology.—**Relation between Daily Rainfall and Flow of the River Shin,** R. H. MacDonald. 1 (Apr.); *Discussion*, 39 (Apr.).

Radio-activity.—**The Impact of Radio-activity on Public Health Engineering Services** (Lecture), Dr Arthur Key and A. W. Kenny. 280 (Aug.).

Sewerage and Sewage Disposal.—**Some Problems in the Disposal of Industrial Effluents and Domestic Wastes,** J. T. Calvert and P. M. Amcotts. 141 (Apr.); *Discussion*, 154 (Apr.); *Correspondence*, 295 (Aug.).

Structures:
Circular Ring.—*See* Structures, design.
Design.—**Experimental Analysis of Space Structures, with Particular Reference to Braced Domes; with a Note on Stresses in Supporting Ring-Girders,** Z. S. Makowski and Prof. A. J. S. Pippard. 420 (Dec.).
Dome.—*See* Structures, design.
Frames and Frameworks.—**The Rapid Calculation of the Plastic Collapse Load for a Framed Structure,** Dr B. G. Neal and Dr P. S. Symonds. 58 (Apr.); *Discussion*, 72 (Apr.).
History.—**The Historical Development of Structural Theory,** Dr S. B. Hamilton. 374 (Dec.); *Discussion*, 402 (Dec.).

PRINTED IN GREAT BRITAIN BY WILLIAM CLOWES AND SONS, LIMITED
LONDON AND BECCLES